**CLAIMS**

1. A method of correcting spectral deformations in the voice, introduced by a communication network, comprising an operation of equalisation on a frequency band (F1-F2), adapted to the actual distortion of the transmission chain, this operation being performed by means of a digital filter having a frequency response which is a function of the ratio between a reference spectrum and a spectrum corresponding to the long-term spectrum of the voice signal of the speakers, principally characterised in that it comprises:

* prior to the operation of equalisation of the voice signal of a speaker communicating:

- the constitution of classes of speakers with one voice reference per class,

* then, for a given speaker communicating:

- the classification of this speaker, that is to say his allocation to a class from predefined classification criteria in order to make a voice reference which is closest to his own correspond to him,

- the equalisation of the digitised signal of the voice of the speaker carried out with, as a reference

spectrum, the voice reference of the class to which the said speaker has been allocated.

2. A method of correcting spectral voice deformations according to Claim 1, characterised in that:

* the constitution of classes of speakers comprises:

- the choice of a corpus of N speakers recorded under non-degraded conditions and the determination of their long-term frequency spectrum,

- the classification of the speakers in the corpus according to their partial cepstrum, that is to say the cepstrum calculated from the long-term spectrum restricted to the equalisation band (F1-F2) and applying a predefined classification criterion to these cepstra in order to obtain K classes,

- the calculation of the reference spectrum associated with each class so as to obtain a voice reference corresponding to each of the classes.

3. A method of correcting spectral voice deformations according to Claim 2, characterised in that the reference spectrum on the equalisation frequency band (F1-F2), associated with each class, is calculated by Fourier transform of the centre of the

class defined by its partial cepstra.

4. A method of correcting spectral voice deformations according to Claim 1, characterised in that:

* the classification of a speaker comprises:

- use of the mean pitch of the voice signal and of the partial cepstrum of this signal as classification parameters,

- the application of a discriminating function to these parameters in order to classify the said speaker.

5. A method of correcting spectral voice deformations according to any one of the preceding claims, characterised in that it also comprises a step of pre-equalisation of the digital signal by a fixed filter having a frequency response in the frequency band (F1-F2), corresponding to the inverse of a reference spectral deformation introduced by the telephone connection.

6. A method of correcting spectral voice deformations according to any one of the preceding claims, characterised in that the equalisation of the digitised signal of the voice of a speaker comprises:

- the detection of a voice activity on the line in

order to trigger a concatenation of processings comprising the calculation of the long-term spectrum, the classification of the speaker, the calculation of the modulus of the frequency response of the equaliser filter restricted to the equalisation band (F1-F2) and the calculation of the coefficients of the digital filter differentiated according to the class of the speaker, from this modulus,

- the control of the filter with the coefficients obtained,

- the filtering of the signal emerging from the pre-equaliser by the said filter.

7. A method of correcting spectral voice deformations according to Claim 6, characterised in that the calculation of the modulus (EQ) of the frequency response of the equaliser filter restricted to the equalisation band (F1-F2) is achieved by the use of the following equation:

$$|EQ(f)| = \frac{1}{|S\_RX(f) L\_RX(f)|} \sqrt{\frac{\gamma_{ref}(f)}{\gamma_x(f)}}, \qquad (0.3)$$

in which $\gamma_{ref}(f)$ is the reference spectrum of the class to which the said speaker belongs,

and in which L_RX is the frequency response of the reception line, S_RX is the frequency response of the

reception signal and $\gamma_x(f)$ the long-term spectrum of the input signal x of the filter.

8. A method of correcting spectral voice deformations according to Claim 6, characterised in that the calculation of the modulus (EQ) of the frequency response of the equaliser filter restricted to the equalisation band (F1-F2) is done using the following equation:

$$C_{eq}^p = C_{ref}^p - C_x^p - C_{S\_RX}^p - C_{L\_RX}^p , \qquad (0.13)$$

in which $C_{eq}^p$, $C_x^p$, $C_{S\_RX}^p$ and $C_{L\_RX}^p$ are the respective partial cepstra of the adapted equaliser, of the input signal x of the equaliser filter, of the reception system and of the reception line, $C_{ref}^p$ being the reference partial cepstrum, the centre of the class of the speaker; the modulus (EQ) restricted to the band F1-F2 being calculated by discrete Fourier transform of $C_{eq}^p$.

9. A system for correcting voice spectral deformations introduced by a communication network, comprising adapted equalisation means in a frequency band (F1-F2) which comprise a digital filter (300) whose frequency response is a function of the ratio between a reference spectrum and a spectrum corresponding to the long-term spectrum of a voice signal, principally characterised in that these means

also comprise:

- means (400) of processing the signal for calculating the coefficients of the digital signal provided with:

• a first signal processing unit (400A) for calculating the modulus of the frequency response of the equaliser filter restricted to the equalisation band (F1-F2) according to the following equation:

$$|EQ(f)| = \frac{1}{|S\_RX(f).L\_RX(f)|}\sqrt{\frac{\gamma_{ref}(f)}{\gamma_x(f)}}, \quad (0.3)$$

in which $\gamma_{ref}(f)$ is the reference spectrum, which may be different from one speaker to another and which corresponds to a reference for a predetermined class to which the said speaker belongs, and in which L_RX is the frequency response of the reception line, S_RX the frequency response of the reception signal and $\gamma_x(f)$ the long-term spectrum of the input signal x of the filter;

• a second processing unit (400B) for calculating the pulsed response from the frequency response modulus thus calculated, in order to determine the coefficients of the filter differentiated according to the class of the speaker.

10. A system for correcting spectral voice deformations according to Claim 9, characterised in that the first processing unit (400A) comprises means (414b, 428b) of calculating the partial cepstrum of the equaliser filter according to the equation:

$$C_{eq}^{p} = C_{ref}^{p} - C_{x}^{p} - C_{S\_RX}^{p} - C_{L\_RX}^{p}, \quad (0.13)$$

in which $C_{eq}^{p}$, $C_{x}^{p}$, $C_{S\_RX}^{p}$ and $C_{L\_RX}^{p}$ are the respective partial cepstra of the adapted equaliser, of the input signal x of the equaliser filter, of the reception signal and of the reception line, $C_{ref}^{p}$ being the reference partial cepstrum, the centre of the class of the speaker, the modulus of (EQ) restricted to the band F1-F2 is then calculated by discrete Fourier transform of $C_{eq}^{p}$.

11. A system for correcting spectral voice deformations according to Claim 9 or 10, characterised in that the first processing unit comprises a sub-assembly (420) for calculating the coefficients of the partial cepstrum of a speaker communicating and a second sub-assembly (410) for effecting the classification of this speaker, this second sub-assembly comprising a unit (411) for calculating the pitch $F_0$, a unit (412) for estimating the mean pitch from the calculated pitch $F_0$, and a classification unit (413) applying a discriminating function to the vector

x having as its components the mean pitch and the coefficients of the partial cepstrum for classifying the said speaker.

12. A system for correcting spectral voice deformations according to any one of Claims 9 to 11, characterised in that it comprises a pre-equaliser (200) and in that the signal equalised from reference spectra differentiated according to the class of the speaker is the output signal x of the pre-equaliser.